

THE CRUSHED STONE JOURNAL

Official Publication
The National Crushed Stone Association

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Annual Banquet**

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St. Louis Will Welcome You

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Cost System**

OCTOBER, 1930

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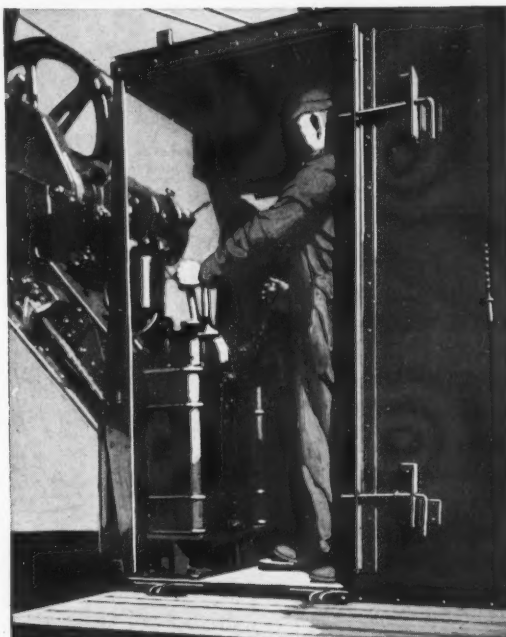
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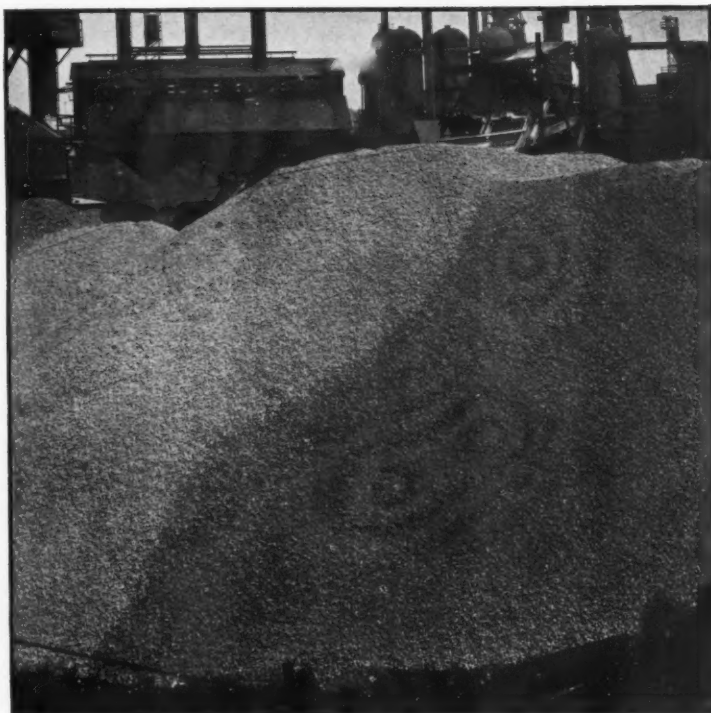
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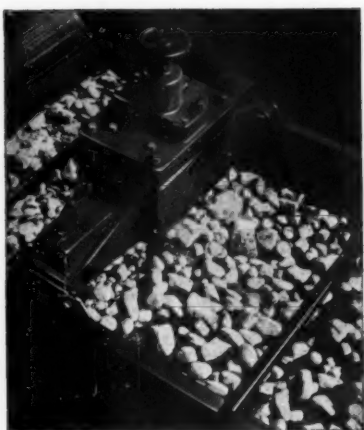
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The CRUSHED STONE JOURNAL

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WASHINGTON, D. C.

October, 1930

Manufacturers' Division Holds Annual Banquet

THE Manufacturers' Division of the National Crushed Stone Association held its annual banquet at the Hotel Pennsylvania, New York City, on the evening of Friday, October 24, with an attendance which exceeded all previous records. H. M. Davison, Harnischfeger Corporation, Chairman of the Division, performed the difficult duties of toastmaster in a most commendable manner and by his wit and humor contributed much to the success of the meeting. As has been the custom for many years the Executive Committee of the National Association held its regular Fall meeting during the early part of the day and the Manufacturers' Division was particularly fortunate in having the members of the Executive Committee present at the dinner as their guests.

After his opening remarks which included a brief history of the Manufacturers' Division, Mr. Davison, introduced W. F. Wise, President of the National Crushed Stone Association. President Wise in his short talk particularly emphasized the desirability of all associate members sending to the annual convention to be held in St. Louis next January as many of their technical men as possible. He also urged the active members to send as many as possible

of their superintendents and operating men as he felt that one of the most valuable benefits to be derived from the convention was the opportunity it affords the superintendents and operating men and the technical representatives and

salesmen of the manufacturing companies to get together. President Wise made a similar plea on the occasion of the Manufacturers' Division banquet last year and stated that it was most gratifying to him to note that many of the companies had sent additional technical men to Cincinnati last January, and that he was thus encouraged to make his plea stronger than ever this year. He expressed on behalf of the Association his very real appreciation for the helpful cooperation of the Division in making the Exposition one of the outstanding features of the annual convention and stated that present indications are that the St. Louis Exposition will be even more interesting and instructive than its predecessors.

John Rice, President of the General Crushed Stone

Co. and a former president of the Association was then introduced and gave a most entertaining talk based largely on reminiscences gained from his contact with the crushed stone industry over a great many years.



H. M. DAVISON, *Harnischfeger Sales Corporation*
Chairman, Manufacturers' Division

Otho M. Graves, Vice-President and General Manager of the General Crushed Stone Co. and for four successive years President of the Association, followed Mr. Rice with a delightfully entertaining talk wherein he emphasized the growth of the Manufacturers' Division and the exceptional spirit of camaraderie and good fellowship which exists between the manufacturers and the producers of crushed stone. Mr. Graves concluded his remarks by introducing Bernard A. McKinney, President of the newly organized New England Crushed Stone Association. Mr. McKinney acknowledged the introduction, but could not be prevailed upon to make a speech.

A. T. Goldbeck, Director of the Bureau of Engineering of the National Crushed Stone Association, under whose supervision the program for the St. Louis Convention is being formulated, briefly outlined the plans for the forthcoming convention.

E. J. Krause, President of the Columbia Quarry Co., and chairman of the Entertainment Committee for the St. Louis Convention, indicated beyond a shadow of a doubt that nothing will be left undone by the St. Louis group to provide the visiting delegates with an exceptionally interesting entertainment program.

Remarks were also made by V. P. Ahearn, Executive Secretary of the National Sand and Gravel Association; A. L. Worthen, Vice-President of The Connecticut Quarries Co., New Haven, Conn.; H. E. Bair, Vice-President, The France Stone Co., Toledo, Ohio; W. O. Dunn, Burton Explosives Co., Cleveland, Ohio; W. C. MacEwen, Allis-Chalmers Mfg. Co., and W. L. Sporborg, General Crushed Stone Co., Syracuse, N. Y.

As the concluding speaker, J. R. Boyd, Secretary of the Association, outlined briefly the plans for the forthcoming exposition. He explained that the exposition circular giving all necessary information was at that time on the press and would shortly be mailed to all associate members. He particularly stressed the desire on the part of the Association's officers to be of more and more assistance to the associate members and pointed out that there was being prepared for distribution to them an accurate list of the members of the Association, including the officers and superintendents of the various companies. In speaking of the list of crushed stone producers of the United States and Canada recently mailed to all associate members, he asked for their cooperation in making this list more accurate by advising his office of any corrections or additions which should be made to the list. He advised the meeting that plans were being made to run a special train to the convention from New York, stat-

ing that the train would leave on Saturday afternoon, January 17, arriving Sunday afternoon, January 18, and urged all who could possibly do so to travel via this train.

At the conclusion of the meeting a rising vote of thanks was extended to Gordon Buchanan, C. G. Buchanan Co., Inc., in appreciation for his work in so successfully making arrangements for the dinner.

Following is a complete list of those who were in attendance:

Manufacturers

Allis-Chalmers Mfg. Co., Milwaukee, Wis.—Irving K. Cox, T. E. Fisher, W. C. MacEwen
 American Manganese Steel Co., Chicago, Ill.—W. M. Black
 American Steel and Wire Co., Chicago, Ill.—D. J. Henecker
 Atlas Powder Co., Wilmington, Del.—A. D. Hammond
 Earle C. Bacon, Inc., New York City—S. F. Macpeak, W. H. Milroy, J. W. Morrissey, T. J. Morrissey, W. V. Pietsch
 C. G. Buchanan Co., Inc., New York City—Gordon Buchanan, G. W. Flounders
 Bucyrus-Erie Co., South Milwaukee, Wis.—J. C. Alexander, J. W. Fawcett, E. G. Lewis
 Burton Explosives Co., Cleveland, Ohio—W. O. Dunn
 Cross Engineering Co., Carbondale, Pa.—W. S. Nicol
 Crucible Steel Co., New York, N. Y.—R. W. Persons
 E. I. duPont de Nemours & Co., Wilmington, Del.—P. J. Kimball, E. I. Wolf
 General Electric Co., Schenectady, N. Y.—D. L. Chesnut
 Gill Rock Drill Co., Lebanon, Penn.—F. A. Gill
 Harnischfeger Sales Corp., Milwaukee, Wis.—T. A. Burns, H. M. Davison, A. F. Gaum, P. H. McGredy
 The Hayward Company, New York, N. Y.—H. C. Ryder
 Hendrick Manufacturing Co., Carbondale, Penn.—B. G. Dann, B. G. Shotton
 Hercules Powder Co., Wilmington, Del.—J. Barab, M. R. Budd, J. H. Horlick, Jr.
 Ingersoll-Rand Co., New York, N. Y.—A. A. Holland
 Keystone Lubricating Co., Philadelphia, Penn.—A. T. Lowry, R. Robinson
 Linn Manufacturing Corp., Morris, N. Y.—R. A. Bowler, M. N. Bridges
 Loomis Machine Co., Tiffin, Ohio—E. E. Winship
 Marion Steam Shovel Co., Marion, Ohio—J. B. Crew, R. L. Johnson, R. P. Sullivan, W. N. Westland
 National Equipment Corp., Milwaukee, Wis.—J. McElroy
 Niagara Concrete Mixer Co., Buffalo, N. Y.—S. C. Hodge
 Nordberg Manufacturing Co., Milwaukee, Wis.—L. D. Hudson, L. D. Hudson, Jr.
 Pit and Quarry, Chicago, Ill.—E. M. Buck
 Robins Conveying Belt Co., New York City—J. H. Robins
 Rock Products, Chicago, Ill.—F. S. Peters, R. C. Sullivan, C. L. Walker
 Ross Screen and Feeder Co., New York, N. Y.—E. Webster
 Sanderson Cyclone Drill Co., Orrville, Ohio—W. F. Nothacker
 Stephens-Adamson Manufacturing Co., Aurora, Ill.—F. S. Wells
 Taylor-Wharton Iron and Steel Co., High Bridge, N. J.—C. B. Andrews, J. C. Taylor
 Thew Shovel Co., Lorain, Ohio—M. S. Cheney, T. F. Henson, R. Savage

Traylor Engineering and Manufacturing Co., Allentown, Penn.
 —D. A. Cheyette, R. R. Shafter
 W. S. Tyler Co., Cleveland, Ohio—Albert E. Reed, N. O. Weil
 Vulcan Iron Works, Wilkes-Barre, Penn.—Thomas MacLachlan
 Westinghouse Electric and Manufacturing Co., East Pittsburgh,
 Penn.—B. Lester

Producers

V. P. Ahearn, Executive Secretary, National Sand and Gravel Association, Washington, D. C.
 W. M. Andrews, Lake Erie Limestone Co., Youngstown, Ohio
 H. E. Bair, The France Stone Co., Toledo, Ohio
 J. R. Boyd, National Crushed Stone Association, Washington, D. C., Secretary
 F. H. Edwards, Connecticut Quarries Co., Inc., New Haven, Conn.
 A. T. Goldbeck, Director, Bureau of Engineering, National Crushed Stone Association, Washington, D. C.
 O. M. Graves, General Crushed Stone Co., Easton, Penn.
 F. T. Gucker, John T. Dyer Quarry Co., Norristown, Penn.
 F. S. Jones, General Crushed Stone Co., Easton, Penn.
 E. J. Krause, Columbia Quarry Co., St. Louis, Mo.
 B. A. McKinney, West Roxbury Trap Rock Co., West Roxbury, Mass.
 R. Moore, General Crushed Stone Co., Easton, Penn.
 John Rice, General Crushed Stone Co., Easton, Penn.
 John Rice, Jr., General Crushed Stone Co., Easton, Penn.
 F. W. Schmidt, North Jersey Quarry Co., Morristown, N. J.
 John H. Schmidt, North Jersey Quarry Co., Morristown, N. J.
 W. L. Spurborg, General Crushed Stone Co., Easton, Penn.
 W. F. Wise, President, National Crushed Stone Association, Dallas, Tex.
 A. L. Worthen, Connecticut Quarries Co., Inc., New Haven, Conn.
 I. W. Wortman, North Jersey Quarry Co., Morristown, N. J.

Canada Spent \$44,000,000 on Highways in 1929

THE latest Government report on the highway and the motor vehicle in Canada states that Canadian highways are becoming increasingly important in the economic structure of the country. In 1929 about \$32,000,000 was spent in Canada on the construction of roads and about \$12,000,000 for road maintenance, a total of about \$44,000,000. Thirty years ago there were no paved roads in the Dominion, now there are about 425,000 miles of paved and improved roads.

While Canada derives a substantial revenue from the tourist trade, tourists from the Dominion leave a goodly sum in the United States and other countries. In 1929 this sum amounted to \$111,000,000, of which \$65,000,000 was spent by those who crossed the international boundary southward bound in 619,572 cars. Canadians who went to the United States by rail and steamer spent \$26,000,000 and \$20,000,000 was spent by those who passed through ocean ports to Europe and other countries.

Safety Measures for Transporting Explosives in Automobile Trucks

REGULATIONS designed to insure the safest conditions possible in the transportation of explosives in motor vehicles have been drawn up by the United States Bureau of Mines, Department of Commerce, for the guidance of its own employees. The Bureau is constantly engaged in the testing and field study of explosives used in mining, and many of its employees are frequently obliged to transport explosives by motor. These regulations have been published in Information Circular 6330, by C. W. Owings, associate engineer and J. M. Harrington, senior foreman miner, in the hope that they may be of value to others whose duties require the movement of explosives by automobile.

"When used in hauling explosives the vehicle must be placarded 'High Explosives—Dangerous' and it must conform with any other regulations, laws, or ordinances of the Interstate Commerce Commission and of the States, municipalities, and communities through which it is to pass," the Bureau's instructions set forth.

"Before explosives are loaded into a vehicle the body of the vehicle should be thoroughly swept.

"Vehicles must always be kept in first class repair.

"Boxes of explosives must be so arranged and stayed in the body of the vehicles that they cannot shift during transportation.

"The containers of explosives must be protected from exposure to the sun's rays, rain, snow, etc. They should rest upon and be covered by a canvas or tarpaulin. Preferably they should be placed and locked in a large covered box or compartment; the inside surfaces should be wholly of wood. The box or compartment must be located as far as possible from the engine and effectively insulated from it and from all sources of electricity. The engine exhaust must be pointed downward.

"No detonators or electric detonators should be hauled with explosives, except when going to make a demonstration; to fire a blast; or in the collection of field samples, and then the detonators or electric detonators must be placed in such a receptacle and at so remote a distance from the explosives in the vehicle that the explosion of the detonators, or electric detonators, could not induce the explosion of the explosives through the intervening barricades. In order

(Continued on page 23)

Asphalt for Airport Runways¹

By PERRY A. FELLOWS

Chief Engineer, Detroit, Mich.

THE development of modern airports brings to the attention of the engineer many problems which demand his earnest consideration. Among the foremost of these is the provision for proper surfacing. It is entirely proper that a group, convened to discuss the various uses of a well established paving material, should include as one of its topics the possibilities of adapting that material to these new uses. An inventory of the requirements to be met, the qualities of the material offered, and the comparative success with which these qualities meet the requirements, leads to a fruitful field for study. A basis for such study should always be found as far as possible in facts. It is proposed now to present some of the facts which have been brought out by the work of developing the Detroit City Airport and these, combined with experiences elsewhere, may be of value in shaping the engineering policies of those charged with the responsibility of airport construction.

It is not advisable, in this field or any other, to follow blindly the calf path of precedent. But it is eminently wise to examine such precedent carefully, with full cognizance of all the surrounding circumstances, and to appropriate therefrom all that is of value in meeting the new combination of conditions.

The construction of the City Airport was not the first evidence of an attempt to provide landing facilities for airplanes, in metropolitan Detroit. A survey by the City Engineer showed that over thirty locations had been used to some extent for that purpose. Not all of these were, in any sense of the word, adequate. Some of them were in fact little more than unimproved, but practically level fields. There were, however, some much better and at least one, the Ford Airport, in the front rank.

Detroit City Airport

During the past eighteen months, the Department of Public Works, through the Airport Division of the City Engineer's Office and its Construction Division, has converted a rough, swampy river bed into an airport. This river-bottom, 200 feet wide, 20 feet deep, its banks

and borders covered with dense underbrush, and used as a rubbish dump, has been graded, provided with fences, turf, concrete and asphalt runways, fuel, hangar and other facilities. It affords excellent service for the hundreds of planes and thousands of pay-passengers that have taken advantage of the facilities offered since the beginning of practical operation in June, 1929.

The Detroit City Airport is one of the outstanding examples of close-in location. It lies well within the city limits, five miles northeast of the City Hall and four and one-half miles due north from the river at Belle Isle Bridge. The Detroit Terminal Railroad is an industrial belt line and its right-of-way adjoins the southern edge of the airport for more than a half mile.

The area of the field is now approximately 270 acres. Authorized additions will increase this to 300 acres in the near future. The land, now owned by the City, is in two strips separated by French Road. The plan to consolidate these parcels by vacating the street, which lies between them, has recently been approved by court decree.

Drainage

In general, the field at Detroit, as finished, is nearly flat and the elevation is 619 feet above sea level.

In addition to the large trunk sewers, which extend the length of the airport, and form a part of the city sewer system, there is a complete drainage layout consisting of laterals, drain tile and catch basins. This network is installed gridiron fashion over the field, and is connected into the large Connors Creek sewer underlying the airport.

To adequately drain the 250 acres, within the airport boundaries, required five miles of 12" to 18" lateral sewers, and seventeen miles of 4" and 6" drain tile laid in trenches backfilled with one-half inch stone. These trenches were, for the most part, in parallel lines fifty feet apart.

The tile in these trenches was laid on a one per cent grade, and the depth of the tile below the surface was from three to four feet.

¹ From the June, 1930, issue of *Engineers and Engineering*

The drainage system for a number of airports has been worked out on the basis of soil characteristics, very much as golf course drainage or farm drainage is designed.

The planning of such work on the basis of intensities of storms, and time of run-off for maximum economy, has been conspicuously lacking. The importance of this latter form of investigation should receive greater emphasis. In Detroit the great variety of filling materials, that went into the preparation of the field, tended to render the results of a soil survey less informative than is ordinarily the case. The plan to build ultimately a comparatively large area of hard surface runways and aprons made the soil characteristics and tile drainage of less significance than it might otherwise have been.

The limited experience with the completed drains in the Detroit City Airport indicates that they are satisfactory.

Preparation of the Surface

Work at the Detroit City Airport has progressed on the full length of both sections of the field. The filling of the creek bed which traverses the field has been done during the past two years by opening it as a dump for excavated material from city paving operations, sewer tunnels, excavations for building foundations and to a limited extent for a rubbish dump. Over 1,000,000 yards of fill were needed to bring the old gully up to the level of the landing areas. Other work incidental to the preliminary preparation of the field included the removal of buildings, trees and brush, fences, old subdivision sidewalks, telephone and electric light poles and other things within the limits of the field. In the westerly portion of the field a \$200,000 garage and repair shop; belonging to the water bureau of the Fire Department, was vacated by them in June, 1928, and the building razed. The salvaged materials were used, so far as possible, in the reconstruction of the building on another site on the west side of the city.

Grading operations have been carried on with a view to having a smooth surface with no slope more than two per cent in any direction. The fills in some instances have exceeded 30 feet and allowance for shrinkage was necessary. A finish layer of top soil has been placed to make it possible to grow a sod on the field.

The areas which have been brought to grade, have been harrowed, fine graded, seeded and rolled. Various seeds were used, some bluegrass and special mix-

tures. Vetch was sown in poor soil and some rye was used to protect the younger plants where needed.

The most complete system of drainage will not always meet the demands of a busy airport. An increasing volume of scheduled flying makes the need for dependable landing surface of constantly growing importance. Year round service, and service that is safe, is becoming a necessity in many locations. This does not mean that all airports should at once be equipped with a full complement of runways. There may be many locations where such provisions need never be made, or if runways are provided they need be of only the lowest type or quite limited in extent.

Sand fields in some locations will be sufficiently improved by oil treatment. The asphalt oil may also answer for the treatment of fields of glacial drift or gravel. The problems of dust, if not of mud, will ultimately force a large number of the operators of important fields to adopt the policy of runway construction.

When these runways are built the character of the surface to be used will depend on the conditions surrounding the immediate problem. The availability of material as well as its cost will have bearing. The paving should be laid on a base that is properly graded, drained and compacted. The character of the surface and the ease of making repairs are also items not to be neglected. Concrete runways apparently have better visibility from the air in summer but in the winter the contrast afforded by the asphalt against a background of snow is quite marked.

The relative importance of these and other possible characteristics will vary for different airports. The task of weighing the requirements and designing the structure to satisfy the demands should be left in the hands of competent engineers.

Hard Surface Aprons and Runways

There is no general agreement in the practice of surfacing the runways, in some of the discussions it would seem as though it must be a definite choice between hard surface runways or, a sod surface over all. We do not agree with this limiting choice but believe that the two types can be combined to good advantage.

The design and construction of runways is the feature of airport engineering that falls to the lot of the highway engineer. Only by means of a long, comparatively smooth surface are airplanes enabled to take-off and land at the prevailing high speeds. Not only is this a present condition but, if the airplane continues

to develop along existing lines, long runways will be required for some time to come. Average landing speeds have increased rather than decreased in recent years, and not even the most optimistic, or radical, of engineers can build an airport solely for helicopters. Only two or three years ago a landing speed of fifty miles per hour was common in commercial work, whereas sixty miles per hour is quite normal today. An airport designed to occupy a permanent place in national aviation must possess runways that are safe and convenient under all conditions.

Sufficient length to allow the plane to come to a stop after a poor landing is therefore the most obvious requisite of a landing field. A hard surface with satisfactory degree of smoothness is equally important, because if the wheels are unduly retarded the plane tends to revolve about them, and when the overturning moment becomes greater than the resisting moment, the result is unfortunate. A strong wind across the runway tends to whip the plane off its course, and so it is important that the plane head into the wind when landing, necessitating runways in more than one direction.

The Detroit City Airport has three runways, two of these are 80 degrees apart, and intersect at their lower ends. Each runway is ultimately to consist of two 100-foot wide pavements, 300 feet apart on centers. One runway bears N. 35° 39' West and the other S. 63° 47' W. The North-South runway has a length of 4,900 feet and the Northeast-Southwest runway a length of 4,150 feet. The prevailing winds closely parallel the latter approach. A taxi strip near their intersection connects the runways with a concrete apron fronting the hangars. The third runway crosses both of these near their intersection.

Thus far, to accommodate planes landing and taking off, 3,450 lineal feet of Portland cement concrete runways have been built at a cost of \$87,295.00; 7,900 lineal feet of asphaltic concrete runways at a cost of \$148,452.58. All runways are 100 feet wide and completely drained. In addition, approximately 1,800 lineal feet of concrete aprons have been constructed at hangar approaches. These aggregate over 25,000 square yards of surface, varying in width from 100 to 150 feet.

The use of hard surfaced runways will undoubtedly increase at airports where a schedule of flights must be maintained in all kinds of weather. At the Detroit Airport such pavements are especially needed because of clay forming a large part of the soil, which cannot be expected to drain quickly in wet weather, despite

the system of drain tile now being installed. It is planned to provide more runways when the additional area is annexed to the airport.

Three types of pavement have been used to surface the runways; one-course plain concrete, sheet asphalt on water-bound macadam base, and two-course bituminous concrete. The hundred foot width of the concrete one-course is laid in eight strips with a longitudinal, premoulded expansion joint between the two central strips. Transverse expansion joints filled with premoulded mastic are placed every thirty feet. The slabs are edged to a half inch radius. The thickness of the slab is seven inches.

The specifications are the outgrowth of long experience with one-course concrete streets and alleys in Detroit. A field mix of 1:2:3 is specified, with either pebbles or crushed stone permitted for the coarse aggregate. The grading of the sand is fully detailed and its fineness modulus must be between 2.60 and 3.60. Pebbles have a fineness modulus between 7.00 and 7.80. and range in size from 2 inch to 1/4 inch. Crushed stone is also graded from 2 inch down and must meet specified tests for hardness, toughness and wearing quality. As in other city paving, water content is indirectly controlled through the consistency of the mix. A maximum slump of three inches is permitted, and, to minimize variation, it is specified that the mixer must have a water measuring tank with a visible gauge. The time of mix is one minute.

Adequate curing of the concrete is secured by keeping it wet for seven days. Because it is recognized that plastic concrete contains more than enough water for complete hydration if evaporation is prevented, curing by silicate of soda has been permitted in the sections so far constructed. In this case the slab is covered with burlap as soon as it is finished and kept wet until hard enough to permit the application of the sodium silicate.

The obligation of the contractor to produce concrete meeting definite strength requirements is checked by test results. Cylinders made from the concrete going into the pavement must develop a strength of 2,500 pounds at the age of 28 days. Slab thickness as well as strength is determined by cores drilled from the completed pavement. These cores must show a compressive strength of 2,500 pounds at 28 days, 3,200 pounds at 90 days and 4,000 pounds at one year.

Three sections of concrete runway under contract have been completed. Cores taken from these sections and tested at 28 days averaged 3,992 pounds per square

inch. The individual core tests ranged as follows:

5360	2495
4520	3900
4370	3310
Average 4750	Average 3235

The cylinders made from this concrete showed an average strength of 3,362 pounds. Three cores taken from the concrete apron broke under the following unit loads:

2860
3800
3560

Average 3407

The corresponding apron cylinders average 2,779 pounds per square inch.

The one-course concrete was laid under three separate contracts. One of these was for 20,415 square yards; one for 11,278 square yards and one for 13,680 square yards. The total cost was \$87,294.10 and the average unit was \$1.93 per square yard, including six cents per square yard for inspection.

The bituminous concrete, or black base pavement, is more of an innovation in Detroit than the other type, but it is the belief of the engineers that it will be satisfactory for the kind of traffic for which it is designed. The fact that there is a large city-owned asphalt plant on the airport property made this kind of construction especially feasible. It consists of two inches of sheet asphalt over five inches of asphaltic concrete. The width is 100 feet and the cross-section shows a six-inch crown at the center. A line of porous six-inch tile in a gravel filled trench is laid under each edge and the center line.

The asphaltic concrete base is a mixture of asphaltic cement with coarse and fine aggregates, conforming to the following composition limits by weight:

Passing 2½ inch screen, retained on 1¼ inch	15 to 45%
Passing 1¼ inch screen, retained on ¾ inch	15 to 45%
Passing ¾ inch screen	25 to 40%
Bitumen (asphalt cement soluble in carbon disulphide)	4 to 7%

This mixture is delivered at a temperature of 225°F. to 325°F. and laid on a dry sub-grade. It is laid in two layers so that it can be more completely compacted.

Part of the section of black base lies over a filled-in water hole. The pressure of the roller served to bring water to the surface by an artesian well effect, producing muddy spots on the surface of the base. Spread-

ing hay over the sub-grade prevented recurrence of this trouble.

The surface course consists of asphaltic cement, sand and mineral dust, mixed to produce the following composition:

Bitumen	6 to 7.5%
Mineral matter passing 200 mesh screen	6 to 8%
Mineral matter passing 80 mesh screen	8 to 10%
Mineral matter passing 40 mesh screen	12 to 15%
Mineral matter passing 10 mesh screen	8 to 10%
Mineral matter passing ¾ mesh screen	45 to 55%

The asphalt mixtures for the sections constructed by the Department of Public Works were prepared at the neighboring municipal asphalt plant on French Road.

The asphaltic concrete runways were built as six different jobs. Two of these aggregating 62,124 square yards were contracted by the Detroit Asphalt Paving Company for a total of \$96,847.88. The unit cost on one job was \$1.61 per square yard and on the other was \$1.66 per square yard, including the six cents per square yard for inspection.

One section of the asphaltic concrete was built by the Construction Division of the Department of Public Works, under contract secured by competitive bidding—19,136 square yards costing \$30,333.43, were included in this contract. The unit price \$1.58 included six cents for inspection.

The three remaining sections of asphaltic concrete were built by the Department of Public Works under force account. These amounted to 31,460 yards and cost \$50,336.00.

One section of runway 500 feet long was built during the winter when it was planned to hold the All-American Aircraft Show at the City Airport. Because of the fact that the ground was frozen it was necessary to resort to blasting to prepare the grade. This section was built as a 3" sheet asphalt top on a 12" water-bound macadam base. The cost was not segregated from other work done at the same time, but is estimated at \$3.00 per square yard, because of the unusual conditions under which the work was done.

The totals for hard surface completed are 164,093 square yards for a cost of \$282,811.31. Plans are being prepared for additional strips. The average unit cost is \$1.72 including inspection. In every instance the usual grading and drainage were also included.

Other examples of runway construction can be found in the Detroit area and elsewhere. A study of the advantages and disadvantages of these will afford an interesting and continuous program. There is no doubt that asphalt will continue to play an important part.

RUNWAY AND APRON DATA Including Grading and Drainage

Symbols	Type of Construction	Length	Width	Sq. Yards	Cost	Unit Cost	Remarks
MAIN HANGAR APRON	7" 1. Course Concrete	Approx. 1,200.	150	20,415.	\$40,122.60	\$2.03*	Contract Otis Cem. Const. Co.
1-A	3" Sh. Esph. on Water-Bound Macadam Base	500.	100	6,000.	18,000.00	3.00‡	(D. P. W.) Force Acct. Built in Midwinter Blasting
1-B	7" 1. Course Concrete	1,000.	100	11,278.	22,137.00	2.02*	Contract Smith Paving Co.
1-C	2" Asph. Concrete on 5" Black Base	800.	100	8,900.	14,240.00	1.60‡	(D. P. W.) Force Acct.
1-D	2" Asph. Concrete on 5" Black Base (Street Type Crown)	1,800.	100	19,136.	30,333.43	1.58*	(D. P. W.) Contract
2-A	2" A. C. on 5" B. B. (Street Type Crown)	1,000.	100	11,280.	18,048.00	1.60‡	(D. P. W.) Force Acct.
2-B Runway & Apron Combined	7" 1. Course Concrete (Alley Type Crown)	1,250.	100	13,650.	25,034.10	1.83*	Contract Otis Cem. Const. Co.
2-C	2" A. C. on 5" B. B. (Street Type Crown)	2,800.	100	30,978.	49,783.58	1.61‡	Contract Detroit Asphalt Pav. Co.
4-A	2" A. C. on 5" B. B. (Street Type Crown)	1,000.	100	11,280.	18,048.00	1.60‡	(D. P. W.) Force Acct.
3-	3" A. C. on 5" B. B. (Street Type Crown)	2,800.	100	31,146.	47,064.30	1.66	Detroit Asphalt Pav. Co.
		14,150. (2.6 Mi.)		164,093.	282,811.31	Average \$1.72	
	Average Cost of Concrete					\$1.92	
	Average Cost of Asphalt					\$1.57	
	*—includes Inspection (6c per Sq. Yard)						
	‡—estimated						

Fourteenth Annual Convention

National Crushed Stone Association

Hotel Jefferson

—

St. Louis, Mo.

January 19, 20, 21 and 22, 1931

All crushed stone producers of the United States and Canada are most cordially invited to be present and participate in this annual business meeting of the crushed stone industry.

Make your Reservations immediately by writing direct to the
Hotel Jefferson, St. Louis, Mo.

St. Louis Will Welcome You

ST. LOUIS is anxiously waiting to welcome you in January. And when we say St. Louis we are not confining ourselves to the companies in your line of business in St. Louis—every citizen, every organization is waiting to extend to you the glad hand of hospitality on January 19, 20, 21 and 22.



New Civil Court House

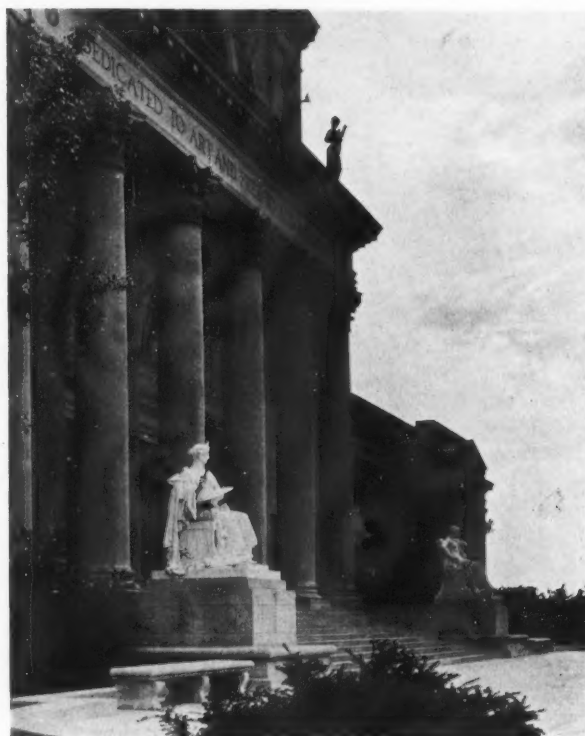
St. Louis will be your home for four days at least, perhaps longer—we hope so—during that time you will become familiar with many of the things our people have told you about with pride.

You will see the Old Court House. It stands at the corner of Broadway and Market Street, a century-old historic spot on the steps of which slaves were auctioned in antebellum days, along with other personal property. The stone auction block may still be seen, also the prison cells in the basement, and the courtroom in which Dred Scott's famous case for freedom

was begun. At that time Missouri was the center of the seething discussion between North and South which soon after culminated in the Civil War.

This old landmark still stands, strong and sturdy, a tribute to the honest construction of its erectors. During recent years it has housed valuable old court records, and the circuit and probate courts. Its grounds formerly contained a whipping post, used in dispensing justice, and a granite boulder still marks the starting point of the old Boone Lick Trail, over which traveled the pioneers to the West. The old court house was among the land marks mentioned in Winston Churchill's novel, "The Crisis."

In the days preceding the Civil War, Ulysses S. Grant, who later commanded the Northern forces and finally became President of the United States, was a farmer near St. Louis and sold wood in the city. The cabin in which he lived, built of logs by Grant with his



Entrance to Art Museum

own hands, is still preserved and can be seen by visitors.

The cabin stands today about a mile and a half from its original site, near the entrance to the country place of a wealthy St. Louisan, which is called Grant's Farm. The cabin was removed log by log and exhibited at St. Louis World's Fair, and with the same care was replaced in its present location. Surrounding it is a fence built of rifle barrels collected from battlefields of the Civil War.

After viewing these interesting historic spots, you may wish to turn your attention to more modern things. In that event, located near the city and easily accessible to visitors, is the huge two million dollar Municipal Airport. It is one of the best and most completely

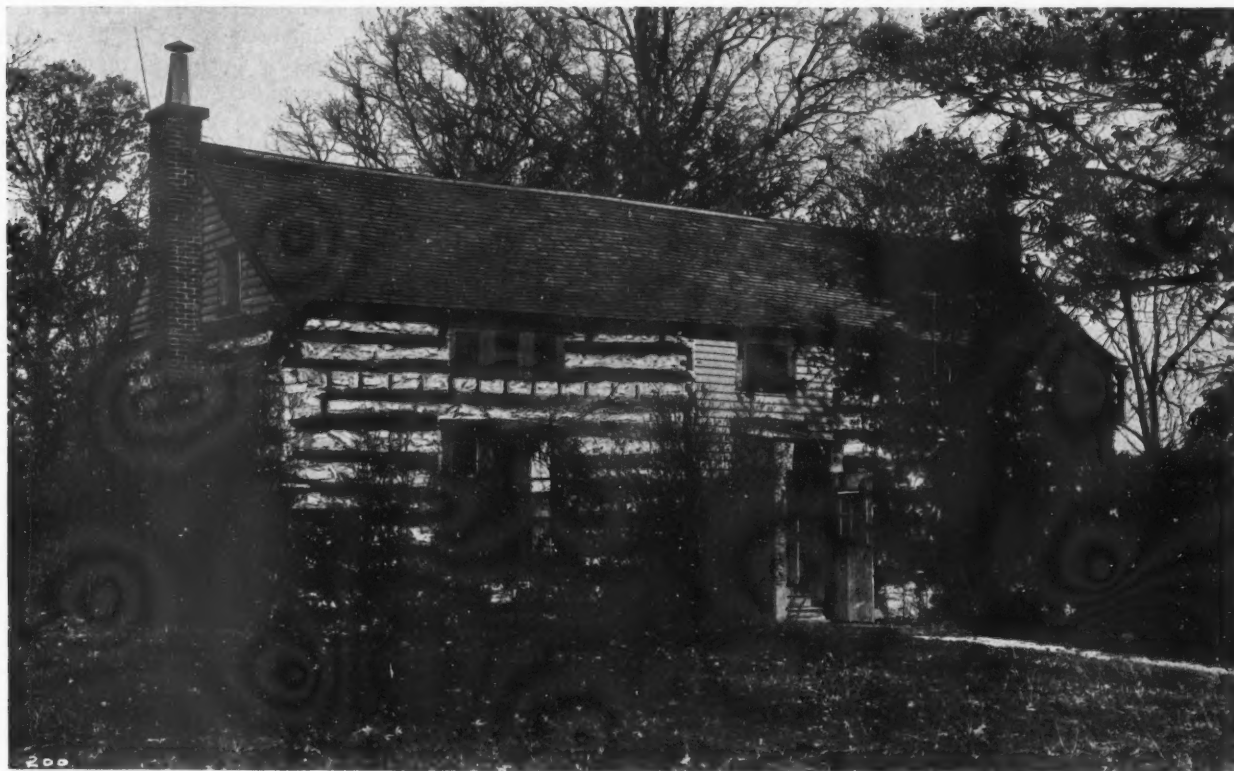
equipped landing fields in the country. This airport was made famous as the starting point of Colonel Lindbergh's epic flight. It was while he was a pilot for the St. Louis Air Mail Service flying from this field that he conceived the idea of flying across the Atlantic and made plans here for the flight.

Extensive factories for the manufacture of standard planes and motors are in busy operation at the airport. Here are built planes similar to the famous "Spirit of St. Louis" as well as other commercial crafts.

Among the interesting modern buildings in St. Louis is the new Civil Court House recently completed at a cost of several million dollars. It is the tallest building in St. Louis and a fine example of modern architec-



Old Court House—A point of historical interest



Grant's Log Cabin Home—Constructed and occupied by him preceding the Civil War

ture. The Bell Telephone building is a new 31-story building, a monumental structure of modern set-back construction. The Railway Exchange building occupies an entire city block in the heart of the city and is noted for the large area of floor space that it contains.

The shopping district of St. Louis cannot fail to intrigue the visitor. Department stores and specialty shops in the city have long borne a national reputation for style, variety and value. Nearly all the great manufacturing concerns in America are here represented, St. Louis being recognized as the natural distributing headquarters for a vast consuming population. Hence, practically anything that can be had anywhere is obtainable in its markets.

In St. Louis the visitor will find many high class amusements of every nature. One of the largest and finest moving picture theatres in the world has recently been completed and, together with the many other fine theatres, shows the newest movie production and gigantic stage revues, the night clubs, the restaurants,

etc., furnish a night life that will make your visit in St. Louis most enjoyable.

The visitor will find St. Louis a city whose residence section will remind him of the pages of a home-builders inspiration book. Row after row of palatial and comfortable residences, embroidered with beautiful trees along great boulevards are distributed through the residential district. You can find houses just as costly in other cities, but it would be difficult for you to find such a variety of good taste in architecture, such as the planting and maintenance of shade trees, shrubbery and flowers, or such great evidence of what can be accomplished in the development of homes. Over 39% of the city's inhabitants are home owners.

St. Louis is indeed the city beautiful. Any attempt to portray literally its beauties and wonders is futile. It can't be done. To be able to understand why it is called the "Miracle City" you must see it for yourself.

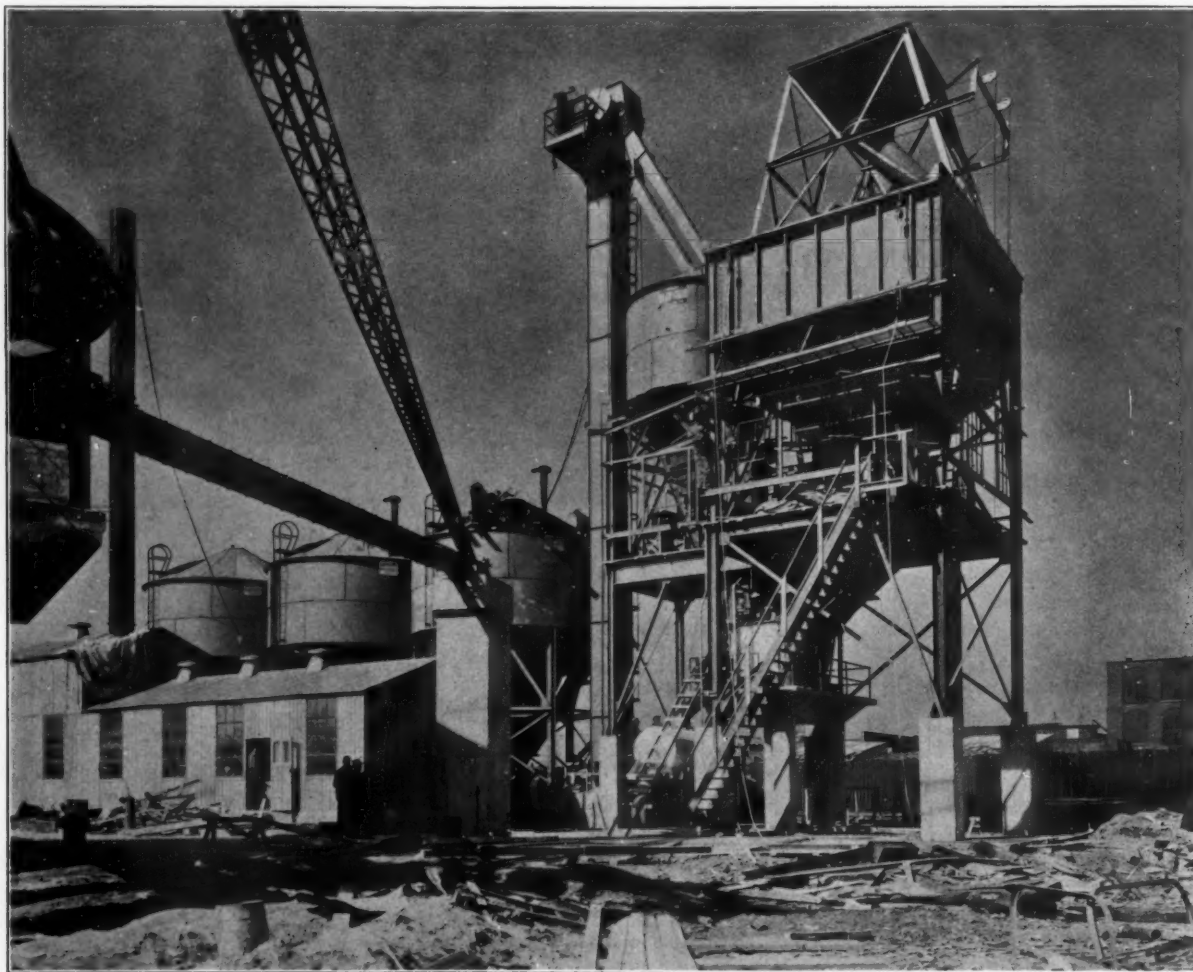
An attraction of which St. Louis is justly proud is Shaw's Garden. Founded in 1850, by Henry Shaw, a

(Continued on page 17)

New Central Mixing Plant in Brooklyn

WHAT is said to be the largest and most complete single unit central mixing plant for ready mixed concrete that has as yet been established in the United States has recently been installed by the Audley Clark Company of Brooklyn, as the first of a series of plants to serve the Greater New York area.

bins has a capacity of 1,500 barrels of cement and is equipped with a water-tight steel cover. The cement bins are loaded from barges by a Fuller-Kinyon pump and discharge into a series of screw conveyors which convey the cement horizontally to the receiving hopper of a vertical cement elevator which elevates the cement and discharges it into a two-compartment 15-foot diameter circular steel bin located adjacent to the mixing plant. This two-compartment bin has a capacity



Ready-Mixed Concrete Plant of the Audley Clark Co., Brooklyn, N. Y.

This initial installation for the Audley Clark Company is unique in that it includes a complete bulk cement storage and handling system. The main storage for cement consists of three twenty-two foot diameter circular steel bins with hopper bottoms. Each of these

of 600 barrels of cement and will accommodate two brands of cement. It is fitted with two discharge gates which feed into a screw conveyor, which in turn discharges into a cement weighing batcher mounted on

(Continued on page 20)

The Advantage of Adopting a Uniform Cost System¹

By JOHN L. CARTER

Chairman, Foundry Cost Committee, National Founders' Association

THIS subject of Cost Accounting has been hashed and rehashed at foundrymen's meetings for many years. A tremendous amount of hot air has resulted, but very little real constructive action. This year your new Cost Committee has decided to attack the problem from a new angle. You have been repeatedly urged to improve your own cost accounting methods—we are going to tell you that when you have educated your own organization to figure costs correctly, you have only done half your duty—that it is also your duty to educate your competitors to figure their costs correctly, if any way can be found to do this.

One of the conditions that frequently prevents us from getting a fair price for our product is that some of our competitors don't know how to figure their costs correctly or don't figure them at all. There is no doubt about this. Ask any purchasing agent, who buys in large quantities, and he will tell you that the variations in bids on his inquiries are often absurd. He will laugh about it. "What fools these foundrymen are," he thinks, and proceeds to take advantage of it for the benefit of his employer.

Some time ago our Newark Association sent out a blue-print to about 20 local foundries and asked them to figure their cost on this job. The weight was given and the production was given. The estimates varied from 4c to 15c per lb. Similar tests have been made by other associations, and the same ridiculous variation has been found. Can there be any doubt that some of these foundries did not know how to figure their costs!

If you should analyze the cases where other foundries underbid you, in some cases they would be more efficient, in some cases more in need of work, but in many cases they would be figuring their costs by some incorrect method, or perhaps just guessing. If we assume that 50% of the business you lose—or say only 25%—is due to ignorance of cost on the part of some other foundries, would it be worth real money

to you to teach those foundries how to figure their costs?

And if you and a number of other foundries in your district were all figuring your cost by the same uniform method, don't you think that a lot of foolish, ridiculous prices would be eliminated?

You may think you are doing your full duty if you know your own costs, have a high standard of business ethics, and run our shop efficiently. But if some of your competitors are ignorant of accurate cost methods, or sound economic principles, *they can disorganize your market and make it impossible for you to earn a fair profit, no matter how efficient you are.*

It is your plain duty to yourselves, your stockholders, and your industry to try to educate your competitors to use scientific cost methods, if any practicable way can be found to do this.

"Oh, yes," you say, "we agree with you, but it can't be done. A uniform cost system would be a fine thing, but you can't put it over." I will admit that a uniform cost system on a national scale would be hard to put over at the present time, but on a local scale it can be done, it has been done, and it has improved conditions very materially. During the last ten years a number of these local Cost Groups have been formed, and have been remarkably successful.

We want to tell you about some of these local Cost Groups, and some of the members of these Groups are here today to give their testimony as to whether such local Cost Groups are worth while. I happen to have had some part in the formation of such a group in Newark, New Jersey. Our plan is not a new experiment, it has been operating for five years—so you see it has been thoroughly tried out.

We have had a foundrymen's association in Newark for a great many years. We had been talking costs for a great many years, but like a good many other associations, we never did anything but talk until in 1923 we finally got down to brass tacks and started a Uniform Cost Group.

One of our foundries had been making a certain customer's work for 20 years—a large account. His

¹ Reprinted from the Bulletin of the National Machine Tool Builders' Association.

price was 6-1/2c per lb. Another quoted 5-1/2c and took away the business. His price was clearly incorrect. The first foundryman came to see me, and he was wild. He said if this sort of thing was going to continue, he could cut prices too, and he could stand the gaff as long as anyone else. Well, gentlemen, after considerable discussion I managed to convert his indignation into a real desire to do something constructive about it. So the two of us called in four other local foundrymen and we started a Uniform Cost Group. We jointly hired a Cost Accountant to install and operate a Uniform Cost System in our foundries.

Naturally, we had our troubles getting started, as anybody would have, and all the foundrymen were not thoroughly sold on the idea at first. Some were skeptical. Some went along just to be good fellows. In fact, one man continued his old system for a year alongside the new one. He thought his old system was better.

But now, after 5 years of operation, what is our verdict? Our original group of 6 foundries has grown to 12, and I can honestly say that every one of our members is enthusiastic about our Cost Group and considers it the most worth while activity the Association has ever undertaken. Everyone will admit that he now has a better cost system than he had before. And he will tell you that it has improved conditions in our district.

I told you of our cost problems sent to 20 foundries, on which the costs varied from 5c to 15c per lb. After the Cost Group had been operating for two years, we sent out another set of cost problems. The answers again varied a great deal but there were fewer ridiculous ones, and in the center of the list, like shock troops in a battle line, stood our little Uniform Group, with a variation of only 3/4 of a cent.

How can this fail to have an effect on the market. Ridiculous prices are less frequent. In our own group they are practically eliminated. We already have a large majority of the local jobbing foundries and we are continually expanding. The market has been stabilized and will be more and more so as we get others to see the light and join us.

Now don't misunderstand me. There is absolutely no price maintenance in this plan. *We stop at cost.* There is still competition among our members, but it is fair and honest and sane competition. It is based on efficiency. *If one foundry is more efficient than another, gets more production or has a lower overhead, he will get a lower cost and can quote a lower*

price. But the guess work—the wild foolish prices—are being gradually eliminated from the field.

There is another advantage in this local cost group which has become of great importance. Periodically we get our Comparative Cost Reports which show various items of cost, such as melting cost, cleaning cost, indirect labor per lb., overhead percentage. No names are given, but you know your own figures, and can compare them with those in other foundries. If you find your costs are high on any particular item, you know right where to concentrate your efforts to bring this item in line with the others.

These Comparative Cost Reports are one of the most valuable things any foundry executive can possibly have to aid him in reducing his costs. They are of great value in pointing out weaknesses, and also in convincing your superintendent that his cost is too high. I personally know of a great many big savings by members of our group, which would not have been effected if we had not had these Comparative Cost Reports.

In our own foundry we have saved about \$5,000 a year on Cleaning Cost alone. Another foundry found their Bench Jobbing division was showing a loss. Their direct labor was high. By continued attention and replacing one or two molders, they changed this loss into a profit, a saving of about \$3,000. Another foundry found that their overhead on floor work was out of line. After six months intensive work on this item, they were able to cut out 10 men, a saving of over \$12,000 per year. Every one of us, gentlemen, has saved the cost of this work many times over.

Another very important advantage is *the tremendously better feeling that is created by these local cost groups.* There is no better way to get rid of some of the feuds and animosities that seem to exist in every foundry district than by *getting men around the table talking things over, getting acquainted, and usually you will find that the fellow you thought before was a fool and maybe a crook, is a pretty good fellow after all.* And if you can change an atmosphere of distrust and antagonism which so often exists, into an atmosphere of friendliness and cooperation, you have made a long step forward.

Silas: "What's that I hear, Hiram, about your hired man falling off the roof when he was shingling the barn last week?"

Hiram: "Yeh. He fell into a barrel of turpentine."

Silas: "Did it hurt him much?"

Hiram: "Don't know. They ain't caught him yet."

St. Louis Will Welcome You

(Continued from page 13)

St. Louis Philanthropist, the Missouri Botanical Garden, popularly known as Shaw's Garden, ranks second only to the famous Kew Gardens of England. It contains the largest collection of plant life in the western hemisphere and is famous the world over for its wealth of botanical species and its beautiful floral displays. It comprises a city garden of about 75 acres, and out-of-town extension of more than 1,600 acres, and a tropical extension at Balboa, Panama.

At the city garden large conservatories are maintained, containing a varied collection of tropical plants and providing for an almost continuous display of chrysanthemums, orchids, lillies and other blooming plants. Out of doors are to be found representative gardens of roses, irises, water lillies, and collections of every other kind of plant which can be grown in this region. The orchid and chrysanthemum shows have established national reputation for the gorgeousness and rarity of their bloom and for the beauty and method of their display. Altogether, more than 11,000 species of plants from all climates and all parts of the globe are to be seen here.

Forest Park, with its 1,400 acres, is one of the largest and most beautiful city parks in America and every visitor will want to see it. It contains a number of picnic grounds, tennis courts, baseball diamonds, soccer fields, a parade ground and three golf links. In this huge park is the Municipal Open-Air Theatre, the Art Museum, the Jefferson Memorial, the new Field House and several other public buildings. There are lagoons for canoeing, miles of soft bridal paths for horseback riding, long serpentine roads for motoring, and hundreds of acres of velvety greensward.

Located in Forest Park is the Zoo, one of the sights of St. Louis. This huge educational and interesting feature has been developed into one of the chief Zoological gardens of America. Experts concerned with the captivity of wild animals have come to St. Louis from all parts of the world to study the ideal methods used here, and particularly to examine the unusual arrangement by which the animal dens and paddocks have been transformed into near to nature haunts. The Zoo contains more than 1,550 living creatures, including mammals, birds, fish, reptiles and amphibians, which have been collected from all parts of the globe. Here are to be seen the new monkey house, filled with simian life of every description, where trained monkeys go through their amusing antics every afternoon; the largest steel-enclosed bird cage in the world, with

its fascinating variety of bird life; the swan lakes, peopled by a strange world of swimming birds; the new reptile house; and "Peacock Valley," with its chain of thirteen lakes teeming with aquatic life.

Huge steel and concrete structures house a comprehensive collection of wild animals such as lions, tigers, leopards, and other great cats; while in similar buildings, especially planned, are to be seen the massive elephants, hippotamus and other creatures. Deer of many varieties and roving animals of a hundred species are confined in ample steel-fenced yards. Every feature of the Zoo is easy of access.

The cageless bear pits, which have attracted the notice of Zoological experts from all over the world, are artificial rocky dens with earth-filled fissures from which native shrubbery and evergreens grow. They are exact concrete reproductions of limestone bluffs along the Mississippi River, from which detailed photographs and plaster casts were specially made as models. Dim caves serve as cool retreats for the bears, and rugged paths permit them to scale the rocks for a certain distance toward the overhanging crests.

Now don't disappoint us—prepare for the time of your life—mark the dates on your calendar *NOW*.

AMONG FRIENDS

A certain bond salesman had not sold a bond for the last six months and was finally fired. He needed some money to tide him over until he could get a job so he went to a friend of his who happened to manage a circus and asked him for a loan. The circus manager said he was sorry but his trained baboon had just died and it was going to cost him \$5,000 or \$10,000 to get a new one; consequently, he could not accommodate him.

The ex-bond salesman thought for a moment and then suggested to his friend that he take the skin from the dead baboon and let him get inside of it, carrying on in the show, thus enabling him to earn a little money.

The circus manager agreed and two or three days later the show went on. The baboon came out and did his stuff, much to the delight of the crowd, who applauded and cheered; and the more they applauded the more he pranced about until, unfortunately, he slipped and fell into the lion's cage. The lion let out a growl and started to pursue him, but our friend, the baboon, for a few minutes kept out of the lion's way.

Finally, seeing that he was about to be captured, he started to yell, "Help! Help!" whereupon the lion said, "Shut up, you fool; do you think you're the only bond salesman out of work?"—*Forbes Magazine*.

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S. L. Kirkpatrick

IT is with very real regret that we record the death of S. L. Kirkpatrick, president of the Orange Quarry Company and the Lambertville Trap Rock Company, both of New Jersey. We are not advised as to the details of Mr. Kirkpatrick's death except that the end came on Saturday, September 20, as the result of an automobile accident.

Mr. Kirkpatrick was a prominent member of the crushed stone industry in New Jersey and enjoyed the love and respect of his fellow producers. He had for some years taken an active interest in the affairs of the National Crushed Stone Association and his untimely death will be keenly felt by his many friends throughout our industry. Our deepest sympathy is extended to his family and business associates in their bereavement.

Ready-Mixed Concrete Manufacturers Will Meet in St. Louis

THE annual convention of the National Ready-Mixed Concrete Association will be held in the Jefferson Hotel, St. Louis, Missouri, on Monday, January 26, 1931, and a most cordial invitation has been extended to all crushed stone producers by J. E. Burke, president, to attend their annual convention.

It is our understanding that a program of exceptional interest is being prepared which should prove valuable and instructive to all manufacturers of ready-mixed concrete. There seems to be an increasing number of crushed stone producers entering this field and through the fortunate circumstance of having this meeting immediately following that of the National Crushed Stone Association in the same city, a real saving is made possible to those who have an interest in and thus desire to attend both conventions. Our own convention will close on Thursday, while that of the National Ready-Mixed Concrete Association will take place on the following Monday. It is hoped that as many as possible of the crushed stone producers interested in ready-mix concrete will arrange to stay over for this meeting.

Special Reduced Fares Authorized for St. Louis Convention

CRUSHED stone producers of the United States and Canada who will attend the Fourteenth Annual Convention of the National Crushed Stone Association to be held at the Hotel Jefferson, St. Louis, Missouri, January 19 to 22, 1931, will be able to make the trip to St. Louis by rail at substantially reduced rates. Special fares have been authorized on the basis of the round-trip identification certificate plan, which procedure permits delegates to the convention to purchase a round-trip ticket to St. Louis on the basis of fare and one-half times the regular one-way fare, or in other words a twenty-five per cent saving on the regular round-trip fare.

It will be recalled that the round-trip identification certificate plan is the one which has been in effect for our conventions over the last four or five years. Under this plan, certificates are distributed from the Secretary's Office to all of those proposing to attend the convention. Upon presentation of the certificate to ticket agent, delegate will be sold a round-trip ticket to St. Louis on the basis of fare and one-half. It is exceedingly important to note, however, that these certificates are only distributed through the Sec-

retary's Office and are not available from any other source. They cannot be obtained from ticket agent. The certificates for the St. Louis Convention will shortly be mailed to all members of the Association and everyone is urged to use these certificates in purchasing his transportation to St. Louis.

In view of the fact that the American Road Builders' Association, the National Crushed Stone Association and the National Sand and Gravel Association are holding their respective conventions in the City of St. Louis during successive weeks it was felt that it would be decidedly advantageous if the railroads could be prevailed upon to authorize the reduced fare to cover all three of these conventions, instead of having reduced fares apply to each separate convention. This would be particularly true of those exhibitors who plan to participate in two or three of these meetings. In asking the railroads for reduced rates, it was, therefore, deemed advisable to act jointly, and consequently after a conference of representatives of the American Road Builders Association, the National Sand and Gravel Association and the National Crushed Stone Association, a joint request was made to the railroads for reduced rates to cover all three meetings. Through the splendid cooperation of the railroads we are glad to be able to announce that reduced rates covering the three meetings have been authorized and it will therefore be possible for those desiring to attend two or three of these meetings to purchase round-trip tickets on the reduced fare basis as early as January 4, having a final return limit of midnight of February 2. This arrangement will permit those exhibitors who are planning to participate in two or three of these shows to obtain the benefit of reduced fares which has not been the case in the past. Detailed instructions regarding the use of the round-trip identification certificates will be transmitted with them at the time of distribution.

National Research Council to Hold Annual Meeting

THE National Research Council will hold its annual meeting in Washington, D. C., on December 11 and 12, and all crushed stone producers are extended a most cordial invitation to be present. The following reports which will be presented at the meeting should be of particular interest to the crushed stone industry:

Durability of Aggregates.

The Effect of Flat and Elongated Particles in Aggregates.

The Effect of Dust Coatings on Aggregates.
Some Experience in Design of Concrete Mixtures.
Durability of Concrete.

I Believe

I believe in the stuff I am handing out, in the firm I am working for, and in my ability to get results.

I believe in working, not weeping; in boosting, not knocking; and in the pleasure of my job.

I believe that a man gets what he honestly goes after; that one deed done today is worth two deeds tomorrow, and that no man is "Down and Out" until he has lost faith in himself.

I believe in today and the work I am doing, in tomorrow and the work I hope to do, and the sure reward that the future holds.

I believe in courtesy, kindness and generosity, in good cheer, in friendship and in honest competition.

I believe there is something doing somewhere for every man ready to do it.

I believe I'm ready—right now.

ELBERT HUBBARD

Executive Committee Meets in New York

THE Fall meeting of the Executive Committee of the National Crushed Stone Association was held at the Hotel Pennsylvania, New York City, October 24, with all members of the Committee present with the exception of C. M. Doolittle who was prevented from attending by his absence in London. Among the important things taken up at the meeting were a detailed analysis of the financial condition of the Association and the perfecting of plans for the forthcoming annual convention in St. Louis.

In connection with the finances it was brought out that the present condition of the Association is better than at any previous time in its existence and the president and officers were highly commended by the Committee for this excellent state of affairs. The tentative program for the St. Louis Convention was given very careful consideration and many excellent suggestions made. The program is now practically completed and will be published in the November or December issue of the *Journal*.

It was decided to route the special convention train from New York to St. Louis via the Pennsylvania Railroad. Full details regarding this will be given in an early issue of the *Journal*.

New Central Mixing Plant in Brooklyn

(Continued from page 14)

the central mixing plant. The total storage for cement at this plant is 5,100 barrels.

The aggregate bin, like the cement bins, is self-cleaning, and is of 300 tons capacity. It is loaded by means of a stiff-leg derrick. A 10' x 10' hopper surmounts the aggregate bin into which a clamshell bucket discharges, the hopper being fitted with a spout and mounted on a turntable so that it can discharge into any one of the four bin compartments. Operating platforms for the two-compartment cement bin and for the aggregate bin are included in the structural supports for the bins. The mixer is supported independently of the bin supports so as not to transmit vibration to the measuring equipment, thus preventing inaccuracies of proportioning.

The proportioning equipment for the control of con-

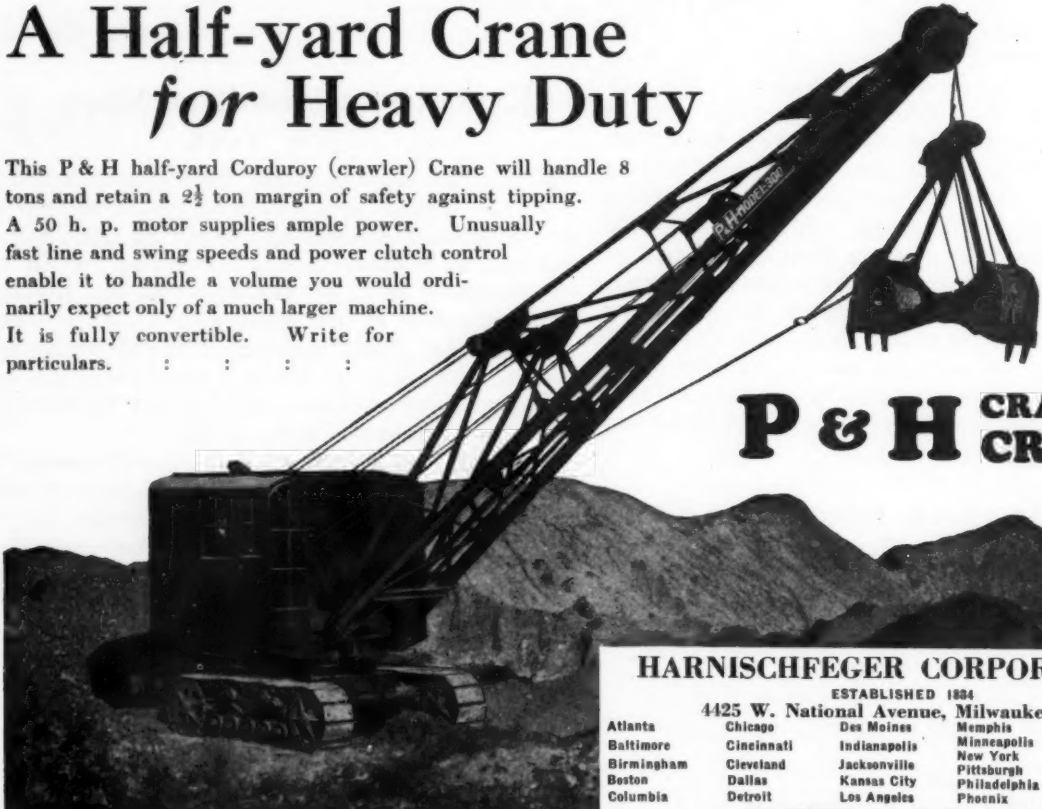
crete, which is attached to the aggregate bin is listed as follows: One quadruple 16,000 lb. weighing batcher for measurement of fine and coarse aggregates. This unit includes four radial gates for the bin and a four-beam scale of the multiple type, one beam for each aggregate. One 3,000 lb. weighing batcher for cement. One 250-gal. water-cement ratio measuring tank with compensating connection for moisture in aggregate.

All of these proportioning units are adequate to measure the necessary ingredients for a 3-yard batch. The controls for operating and the weighing scales are so arranged that one man can measure cement, water, both aggregates and discharge the batch into the mixer.

This entire plant was designed, fabricated and erected by the Blaw-Knox Company of Pittsburgh, Pa., for the Audley Clark Company. The Turner Construction Co., New York City, were supervising engineers and installed the foundations.

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This P & H half-yard Corduroy (crawler) Crane will handle 8 tons and retain a 2½ ton margin of safety against tipping. A 50 h. p. motor supplies ample power. Unusually fast line and swing speeds and power clutch control enable it to handle a volume you would ordinarily expect only of a much larger machine. It is fully convertible. Write for particulars. : : : :



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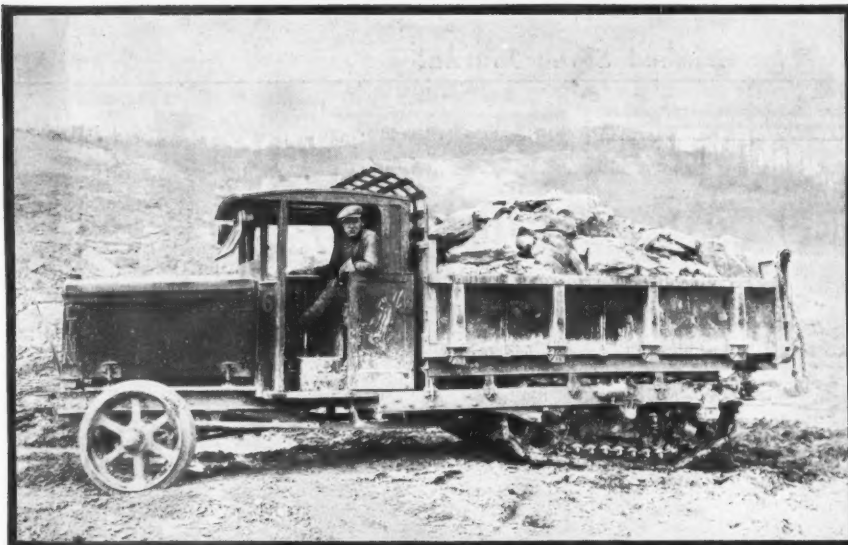
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Here's an extract from an unbiased report of A. C. Nielsen Company, Independent Cost Engineers:—

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In quarry work, the LINN saves the labor and cost of laying track for IT lays ITS own road.

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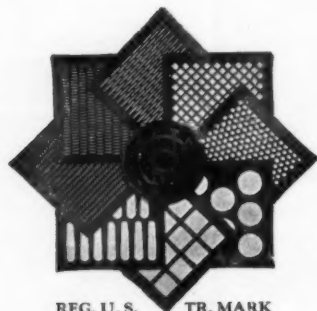
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Safety Measures for Transporting Explosives in Automobile Trucks

(Continued from page 5)

to prevent any accumulation of static electrical charges on the truck a metallic chain sufficiently long so that at least four inches of its end will drag upon the ground should be attached to the rear end of the truck, or motor vehicle.

"No metallic objects, such as tools and machinery, or heavy masses should be hauled in the same vehicle with explosives, or with detonators, or electric detonators.

"No vehicle containing explosives shall be left until the motor has been stopped and the brakes set. Safe practice requires that there should always be a guard on a vehicle containing explosives.

"During haulage of explosives avoid as much as possible congested thoroughfares, places where crowds are assembled, street car tracks, and dangerous crossings."

Information Circular 6330 also contains rules for transporting explosives, as recommended by the Institute of Makers of Explosives, and standard specifications for trucks hauling explosives, prepared by one of the large powder manufacturing companies. The report also recounts a number of recent accidents and gives recommendations as to how such accidents might be avoided.

Copies of Information Circular 6330, "Some Hazards of Transporting Explosives in Automobile Trucks," may be obtained from the United States Bureau of Mines, Department of Commerce, Washington, D. C.

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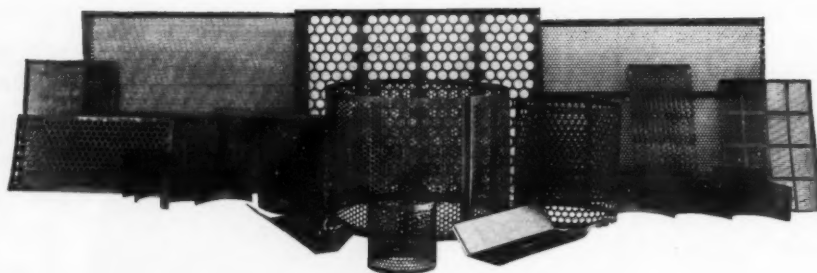
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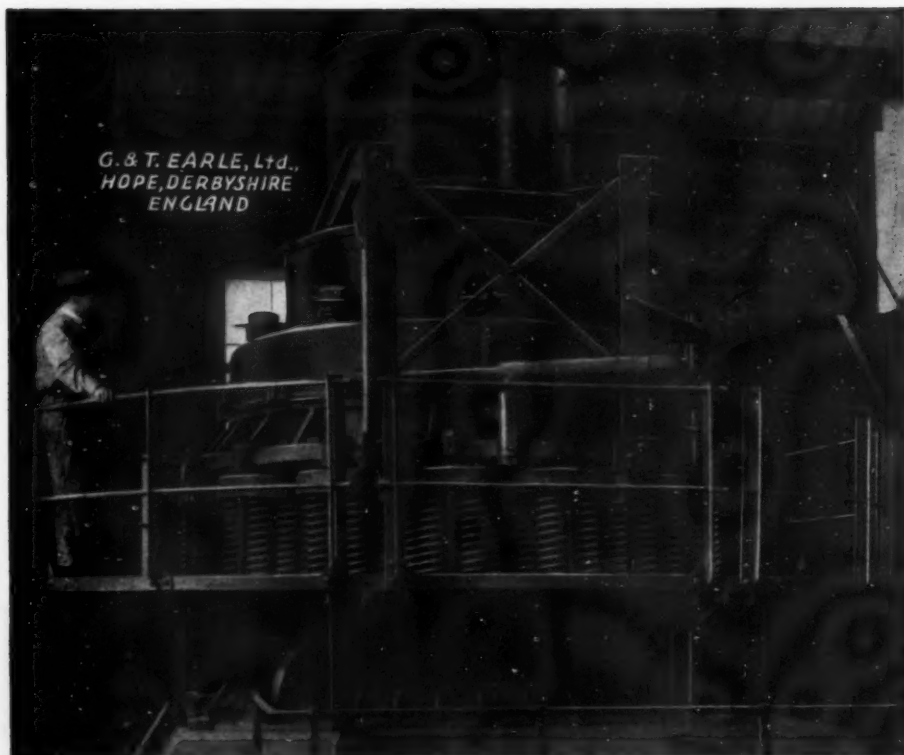
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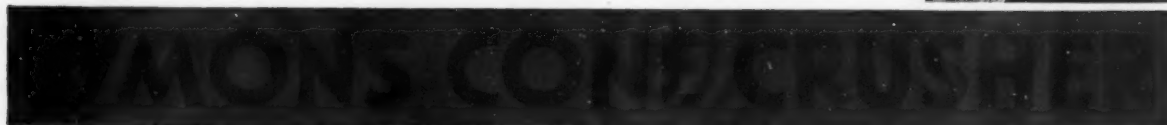
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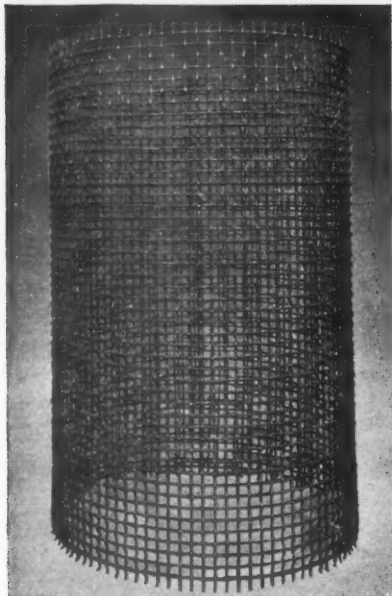
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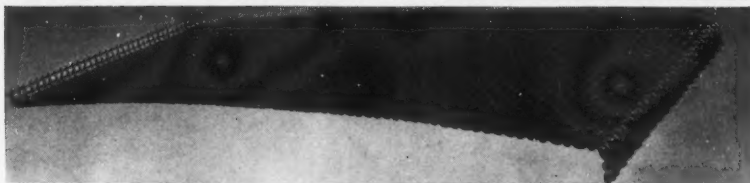


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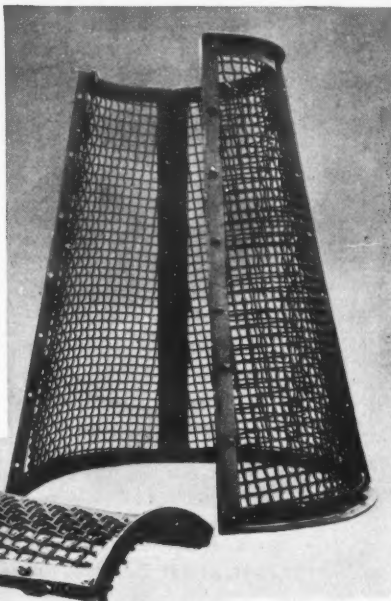
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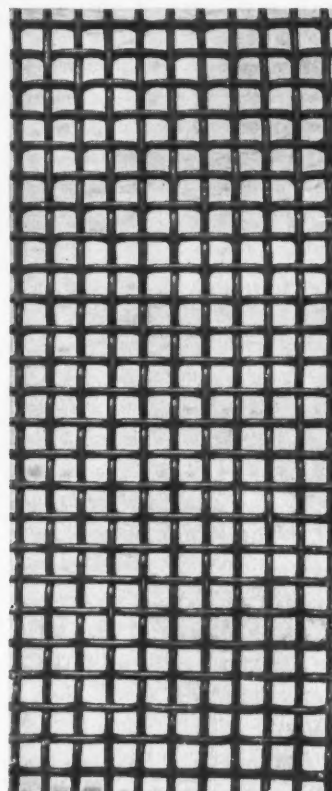
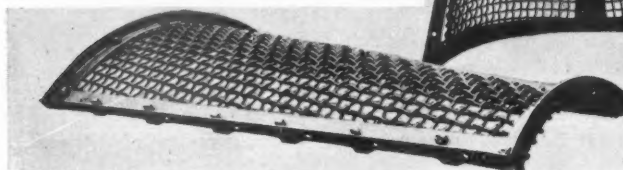
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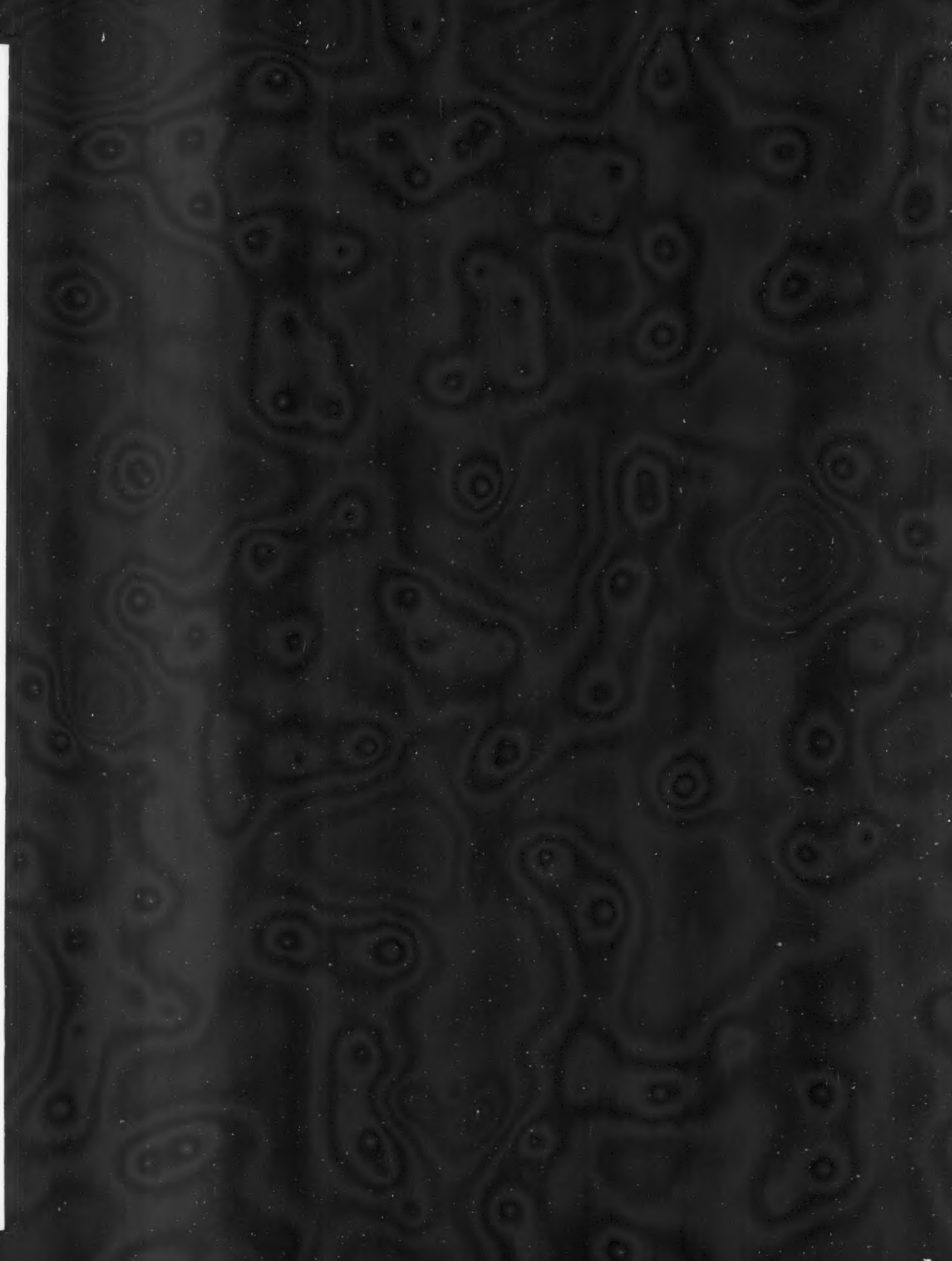
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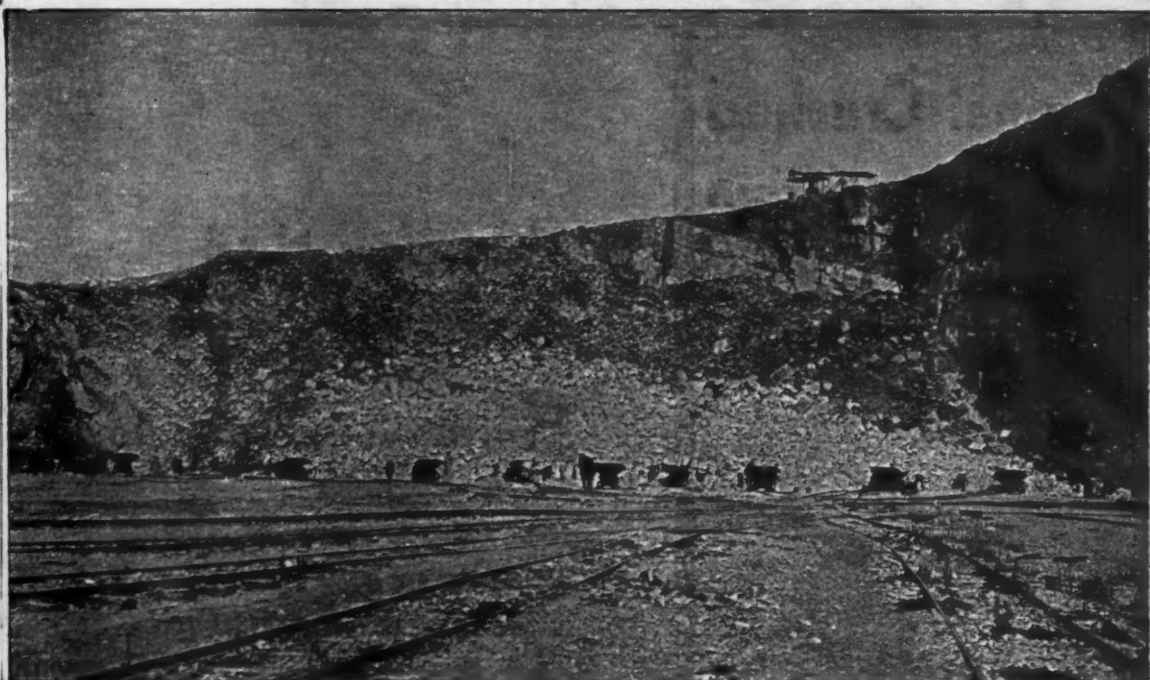
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